Valentina Aquila, Ph.D.

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RESEARCH INTERESTS

- Climate effects of stratospheric aerosol from volcanic eruptions, anthropogenic emissions, and geoengineering using climate modeling techniques and observational satellite data.
- Transport of tropospheric aerosol, *i.e.* from biomass burning and anthropogenic emissions to the stratosphere.
- Changes in stratospheric ozone, circulation, and temperatures.
- Aerosol microphysics: Evolution of the size distribution of volcanic aerosol, and effects of aerosol size on optical properties and lifetime.
- Ageing and mixing state of black carbon and dust particles.

RESEARCH POSITIONS

Feb. 2013 to present — **Johns Hopkins University, Department of Earth and Planetary Sciences**, Baltimore, MD
Associate Research Scientist

2010-2013 — **NASA Goddard Space Flight Center**, Greenbelt, MD
Fellowship within the NASA Postdoctoral Program (NPP), assigned to my proposal *Effect of aerosol/chemistry coupling on climate and air quality*.

2006-2009 — **German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt - DLR)**
Oberpfaffenhofen, Germany
Doctoral Researcher

2004-2006 — **Ludwig-Maximilian University**, Munich, Germany
Doctoral Fellow in Theoretical Particle Physics

EDUCATIONAL BACKGROUND

Dec. 2009 — **Ph.D. in Physics (Meteorology)**
Ludwig-Maximilian University, Munich, Germany.
Advisor: Prof. Dr. R. Sausen and Dr. J. Hendricks (German Aerospace Center – DLR).
Dissertation title: "Global model studies on the distribution and composition of potential atmospheric ice nuclei". Available at edoc.ub.uni-muenchen.de/10944.

Sep. 2004 — ***Laurea* in Physics** (equivalent to B.S.+M.S.)
University of Genoa, Italy.
Thesis Advisor: Dr. G. Ridolfi. *Master Thesis:* Semileptonic B meson decays.

AWARDS

Feb. 2015 — NASA Group Achievement Award as a member of the *Studies of Emissions and Atmospheric Composition, Clouds and Climate Coupling by Regional Surveys* ($SEAC^4RS$) Team.

Apr. 2013 — NASA Earth Science Division Atmospheres Contractor Award for outstanding performance in science.

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FUNDING

2016 PI: P. Colarco (NASA GSFC), Co-Investigators: **V. Aquila**, N. Krotkov, J. Bleacher, B. Garry, P. Whelley, K. Young, (NASA GSFC). Collaborator: V. Martins (University of Maryland Baltimore County). *Towards a Database of Volcanic Ash Optical and Chemical Properties to Support Remote Sensing and Modeling for Earth and Planetary Applications*. Proposal funded by NASA headquarter within the NASA Science Innovation Fund.

2016-2019 PIs: M. McGill and J. Yorks (NASA GSFC). Co-Investigators: E. Nowottnick (USRA), S. Ozog (University of Maryland). Collaborators: S. Rodier (SSAI), **V. Aquila**. *Evaluating the vertical variability of clouds and aerosols over large and small horizontal scales*. Submitted to ROSES 2015: CloudSat and CALIPSO Science Team Recompete.

2015-2016 **Science PIs: V. Aquila** and K. Tsigaridis (Columbia University). Co-Investigators: P. Colarco (NASA GSFC), A. LeGrande (NASA GISS), S. Bauer (Columbia University), B. Cairns (NASA GISS), P. Newman (NASA GSFC), *What should NASA do in case of a major volcanic eruption?* Proposal funded by the NASA Earth Science Division.

2014-2017 PI: M. Chin (NASA GSFC). Co-Investigators: **V. Aquila**, H. Bian (University of Maryland), P. Colarco (NASA GSFC), T. Kucsera (USRA), and T. Diehl (JRC), *Decadal variations of aerosols in the upper troposphere and lower stratosphere: Trends, source attributions, and the role of deep convection.* Proposal funded under NASA ROSES-2013 Atmospheric Compositions: Aura Science Team.

Oct. 2013 Travel support to the Stratospheric Sulfur and its Role in Climate Workshop, Atlanta, GA.

2010-2013 **PI: V. Aquila**, *Effect of aerosol/chemistry coupling on climate and air quality*. Fellowship within the NASA Postdoctoral Program (2+1 year postdoctoral funding).

PUBLICATIONS

***Peer-reviewed publications*.....**

1. Garfinkel, C. I., S.-W. Son, K. Son, **V. Aquila**, L. D. Oman. Stratospheric variability contributed to and sustained the recent hiatus in Eurasian winter warming. Accepted. *J. Geophys. Res.* (2016).
2. Polvani, L. M., L. Wang, **V. Aquila**, D. W. Waugh. The impact of ozone depleting substances on tropical upwelling, as revealed by the absence of lower stratospheric cooling since the late 1990s. Accepted. *J. Clim.* (2016).
3. Jones, A. C., J. M. Haywood, A. Jones, **V. Aquila**. Sensitivity of volcanic aerosol dispersion to meteorological conditions: a Pinatubo case study, *J. Geophys. Res.* in press, doi: 10.1002/2016JD025001 (2016).
4. **Aquila, V.**, W. H. Swartz, D. W. Waugh, P. R. Colarco, S. Pawson, L. M. Polvani, R. S. Stolarski. Isolating the roles of different forcing agents in global stratospheric temperature changes using model integrations with incrementally added single forcings, *J. Geophys. Res.*, 121, doi: 10.1002/2015JD023841 (2016). *Science highlight on the NASA GSFC Earth Science Division homepage in September 2015.*
5. Zhu, X., J.-H. Yee, M. Cai, W. H. Swartz, L. Coy, **V. Aquila**, R. Garcia, and E. R. Talaat, Diagnosis of Middle Atmosphere Climate Sensitivity by the Climate Feedback Response Analysis Method, *J. Atmos. Sci.*, 73, 3-23, doi: 10.1175/JAS-D-15-0013.1 (2015).
6. **Aquila, V.**, C. Garfinkel, P. A. Newman, L. D. Oman, D. Waugh, Modifications of the QBO by perturbations of the stratospheric aerosol layer, *Geophy. Res. Lett.*, 41(5), 1738-1744, doi:

10.1002/2013GL058818 (2014). *Science highlight on the NASA GSFC Earth Science Division homepage in March 2014*.

7. Kaiser, J. C., J. Hendricks, M. Righi, N. Riemer, R. A. Zaveri, S. Metzger, and **V. Aquila,** The MESSy aerosol submodel MADE3 (v2.0b): description and a box model test, *Geosci. Model Dev.*, 7, 1137-1157, doi:10.5194/gmd-7-1137-2014 (2014).
8. Pitari, G., **V. Aquila**, B. Kravitz, A. Robock, S. Watanabe, N. De Luca, G. Di Genova, E. Mancini, and S. Tilmes, Stratospheric Ozone Response in Experiments G3 and G4 of the Geoengineering Model Intercomparison Project (GeoMIP), *J. Geophys. Res.*, 119(5), 2629-2653, doi: 10.1002/2013JD020566 (2014).
9. **Aquila, V.**, L. D. Oman, R. S. Stolarski, A. R. Douglass, P. A. Newman, The response of ozone and nitrogen dioxide to the eruption of Mount Pinatubo at southern and northern midlatitudes, *J. Atmos. Sci.*, 70, 894-900, doi: 10.1175/JAS-D-12-0143.1 (2013). *Science highlight on the NASA GSFC Earth Science Division homepage in April 2012.*
10. **Aquila, V.**, L. D. Oman, R. S. Stolarski, P. R. Colarco, P. A. Newman, Dispersion of the volcanic sulfate cloud from a Mount Pinatubo-like eruption, *J. Geophys. Res.*, 117(D06216), doi:10.1029/2011JD016968 (2012).
11. **Aquila, V.**, J. Hendricks, A. Lauer, N. Riemer, H. Vogel, D. Baumgardner, A. Minikin, *et al.*, MADE-IN: a new aerosol microphysics submodel for global simulations of insoluble particles and their mixing state, *Geosci. Model Dev.*, 4(2), 325-355. doi:10.5194/gmd-4-325-2011 (2011).
12. **Aquila, V.**, P. Gambino, G. Ridolfi, and N. Uraltsev, Perturbative corrections to semileptonic b decay distributions, *Nucl. Phys. B*, 719, 77-102 (2005).

Submitted .....

13. Garfinkel, C. I., **V. Aquila**, D. W. Waugh, L. D. Oman. Time varying changes in the simulated structure of the Brewer-Dobson circulation. Submitted. *Atmos. Chem. Phys. Discuss.*, doi: 10.5194/acp-2016-523 (2016).
14. Visioni, D., G. Pitari, and **V. Aquila**. Sulfate geoengineering: a review of the factors controlling the needed injection of sulfur dioxide. Submitted. *Atmos. Chem. Phys. Discuss.*, doi: 10.5194/acp-2016-985 (2016).

Book chapters.....

15. Contributing author to the 2014 Assessment on Ozone Depletion of the World Meteorological Organization.
16. Hendricks, J., M. Righi, and **V. Aquila**, Global atmospheric aerosol modeling. Chapter in *Atmospheric Physics. Background - Methods – Trends*, ed. U. Schumann, Springer (2012).

Technical reports .....

17. Randles, C. A., A. da Silva, V. Buchard, A. Darmenov, P. R. Colarco, **V. Aquila**, H. Bian, E. P. Nowottnick, X. Pan, S. Smirnov, H. Yu, and R. Govindaraju. The MERRA-2 Aerosol Assimilation. Technical Report. NASA Goddard Assimilation Office (GMAO). Soon available at http://gmao.gsfc.nasa.gov/reanalysis/MERRA-2/docs/.

SELECTED PRESENTATIONS

June 2016 — NASA Workshop on how to respond to a major volcanic eruption, Greenbelt, MD (**invited talk)**

Apr. 2016 — SPARC *Stratospheric Sulfur and its Role in Climate* (SSiRC) Workshop, Potsdam, Germany **(talk)**

Jan. 2016	Seminar within the series "The Diversity of Science" at Loyola University, Baltimore, MD **(invited talk)**
Jan. 2016	Marvin Geller Symposium at the meeting of the American Meteorological Society, New Orleans, LA (poster)
July 2015	Seminar in Dr. K. Rosenlof group at NOAA, Boulder, CO **(talk)**
July 2015	GeoMIP Workshop, Boulder, CO **(talk)**
July 2015	SPARC Composition and Transport in the Tropical Troposphere and Lower Stratosphere (CT3LS) Meeting, Boulder, CO **(talk)**
Apr. 2015	Special Earth Science Seminar, NASA Planetary Geodynamics Laboratory **(talk)**
Apr. 2015	SPARC Temperature Trends group meeting, Victoria, BC, Canada **(talk)**
Dec. 2014	Fall meeting of the American Geophysical Union, San Francisco, CA (poster)
Dec. 2014	Seminar at San Jose State University, San Jose, CA **(invited talk)**
Apr. 2014	AeroCenter Seminar, NASA GSFC, Greenbelt MD **(talk)**
Nov. 2013	Seminar at the School of Marine and Atmospheric Sciences, Stony Brook University, NY (**invited talk**)
Oct. 2013	Stratospheric Sulfur and its Role in Climate (SSiRC) Workshop, Atlanta, GA (poster)
June 2013	Young Scientists Forum, NASA GSFC, Greenbelt, MD **(talk)**
Apr. 2013	GeoMIP Workshop, Institute for Advanced Sustainability Studies, Potsdam, Germany **(talk)**
Jan. 2013	Atmospheric Chemistry Department seminar, Howard University **(invited talk)**
Dec. 2012	Fall meeting of the American Geophysical Union, San Francisco, CA (poster)
Sep. 2012	AeroCom workshop, Seattle, WA (poster)
June 2012	Chapman Conference on Volcanism and Climate, Selfoss, Iceland (poster)
Feb. 2012	Atmospheric Chemistry Division Seminar, NOAA, Boulder, CO **(talk)**
Dec. 2011	Fall meeting of the American Geophysical Union, San Francisco, CA (poster)
Nov. 2011	IYC Symposium on stratospheric ozone and climate change, Washington DC (poster)
Apr. 2011	European Geosciences Union, Vienna, Austria (poster)
Sep. 2010	AeroCom Workshop, Oxford, UK (poster)
Aug. 2010	Spring meeting of the American Geophysical Union, Foz du Iguassu, Brazil **(talk)**
June 2009	Goldschmidt Conference, Davos, Switzerland **(talk)**

TEACHING AND MENTORING

Fall 2016	Teacher for the course "Introduction to Climate Change" for retired and semi-retired individuals at the Osher Lifelong Learning Institute.
Fall 2014	Solo-teacher for the course: "Freshmen Seminar: Introduction to Climate Change" at Johns

Hopkins University for 36 freshman students.

2014 Lecture on climate change at George Mason University for 40 Environmental Engineering students.

2014 Lecture on *Stabilization Wedges: Solving the Climate problem for the Next 50 Years with Current Technologies* (Pacala and Socolow, Science, 305, 2014) at Johns Hopkins University for 40 undergraduate students.

Since 2014 Role model in FabFems, a national database of women in science, technology, engineering and mathematics professions to inspire young women.

2013-2015 Mentor to a postdoctoral fellow in the NASA Postdoctoral Program

2005 Teaching assistant for the Advanced Quantum Mechanics course for master students in Physics, Ludwig-Maximilian University.

2000 Teaching assistant for the Physics laboratory for master students in biology.

SERVICE

2015-2016 Guest editor for *Atmospheric Chemistry and Physics* and *Atmospheric Measurement Techniques* joint special issue "Ten years of Ozone Monitoring Instrument (OMI) observations".

Since 2014 Co-organizer of the NASA GSFC Young Scientist Forum in 2014, 2015, and 2016.

Since 2014 Committee member of the AeroCenter, an interdisciplinary union of researchers in aerosol science based at NASA GSFC.

May 2013 Service work for a NASA proposal review panel.

Since 2012 Reviewers for proposals for NASA, NSF, and Swiss National Science Foundation.

Since 2011 Volunteer judge for the Outstanding Student Paper Award at the 2011, 2012, and 2014 Fall Meeting of the American Geophysical Union.

Since 2011 Peer-reviewer for *Journal of Geophysical Research*, *Geophysical Research Letters*, *Aerosol Science and Technology*, *Geoscientific Model Development*, *Atmospheric Chemistry and Physics*.

OUTREACH

Apr. 2016 Invited speaker at the "Scientist Meet & Greet", a monthly event of the Koshland Museum of the National Academy on Sciences.

Mar. 2016 Volunteer judge for the GLOBE Northeast and Mid-Atlantic regional science fair.

Feb. 2016 Invited speaker at the *La Giornata del Fisico*, an event organized by the Physics Department of the University of Genoa, Italy to present high-school students with different career paths available to physics graduates. Genoa, Italy.

Oct. 2015 Speaker at a professional development workshop for K12 teachers organized by the Maryland and Delaware Climate Change Education Assessment and Research (MADECLEAR). Baltimore, MD.

June 2015 Interviewed for the research project "Encouragement and Success of Women in Science" by an undergraduate student at the College of Williams and Mary.

Mar. 2015 Invited speaker at the Rockville Science Café, organized by the Rockville Science Center. Rockville, MD.

July 2014 Lecture on the use of climate data in public health for two classes of high school

students, within the Howard Hughes Medical Institute sponsored Jump Start program. College Park, MD.

March 2013 Lecture at the Mount View Middle School on the effect of volcanoes on climate for 7th graders. Marriottsville, MD

Since 2013 Peer-reviewer for PUMAS (Practical Uses of Math and Science), an online journal of math and science examples for pre-college education.

2012-2015 Volunteer science interpreter at the Marian Koshland Science Museum of the National Academy of Sciences, guiding visitors through exhibitions, leading and designing hands-on activities. Washington, DC.

Sep. 2012 Participation in *Worldwide Views on Biodiversity*, a project to engage ordinary citizens in the process of policymaking and awareness raising on biodiversity. Washington, DC.

Since 2012 Judge at several local K12 science fair.

2012 Participation in the NCTAF (National Commission on Teaching America's Future) learning studios, an initiative to connect local STEM teachers to scientists to develop new teaching methods. Greenbelt, MD.

2003 Science interpreter for the science fair "*Festival della Scienza*", organized by the Italian National Research Council. Genoa, Italy.

ADDITIONAL TRAINING

2014 *Preparing Future Faculty Teaching Academy*, Johns Hopkins University.

2014 *Preparing for an Academic Career in the Geosciences,* NAGT workshop, University of Pittsburgh.

2014 *Summer Teaching Institute*, Johns Hopkins University.

2014 *University Teaching 101*, Johns Hopkins University online course.

2013 *6.00x Introduction to Computer Science and Programming*, MITx online course.

2011 *Technical Writing Workshop*, NASA GSFC.

2011 *Proposal Writing Workshop*, NASA GSFC.

2008 *School on Science Communication to Non-Scientists*, JRC, Ispra, Italy.

2007 *European Research School on Atmosphere*, Grenoble, France.

AFFILIATIONS

American Geophysical Union, Earth Science Women's Network, American Meteorological Society.

LANGUAGES

Native Language Italian. Fluent in English, Spanish and German. Elementary knowledge of French.